

# Randomised study of sterile versus non-sterile urethral catheterisation

**E A Carapeti BSc FRCS**

*Surgical Registrar*

**S M Andrews MA FRCS**

*Surgical Registrar*

**P G Bentley MS FRCS**

*Consultant Surgeon*

Kent and Sussex Hospital, Tunbridge Wells, Kent

**Key words:** Urethral catheterisation; Urinary tract infection; Perioperative; Cost

**Indwelling urethral catheters are the most common cause of urinary tract infections (UTI), yet there is no direct evidence that technique of catheter insertion affects this. In a prospective study, 156 patients underwent preoperative urethral catheterisation, randomly allocated to 'sterile' or 'clean/non-sterile' technique groups. There was no statistical difference between the two groups with respect to the incidence of UTI. There was a considerable cost difference between the two groups, the 'sterile' method being over twice as expensive as the 'clean' method. Strict sterility is not necessary in preoperative short-term urethral catheterisation and is more expensive and time consuming.**

Different techniques of urethral catheterisation are in use in hospital practice with considerable variation in staff time and cost. Urethral catheterisation remains the most common cause of nosocomial infection in medical practice, and may cause serious or life-threatening complications (1). Urinary tract infections (UTI) account for over 40% of all nosocomial infection, almost all being associated with indwelling catheters (2,3). Closed sterile catheter drainage has markedly reduced the incidence of UTI (4), and the effect on bacterial adherence of coating catheters with silver, Teflon® and salicylic acid has been studied (5,6). Aseptic technique is believed to be important in reducing the incidence of UTI (7), yet there is no direct evidence for this, although many studies have shown benefit from the use of prophylactic antibiotics (8-10). This study aims to assess the rate of

(UTI) after short-term perioperative urethral catheterisation employing two different techniques, and compares the costs.

## Patients and methods

All general surgical patients to be catheterised preoperatively after induction of anaesthesia were included, except patients already with indwelling catheters, those with known pre-existing UTI and those undergoing surgery of the lower urinary tract. Patients were randomly allocated to one of two groups by the throw of a coin and catheterised according to one of the following methods:

*Sterile catheterisation* involved 'scrubbing' for 4 min, gowning up, wearing sterile gloves and using strict aseptic technique. With the patient lying supine, a sterile catheterisation pack was used and the patient's external urethral meatus carefully cleaned using Savlon® solution while avoiding direct contact with operator's gloves. The area was draped and, with a no-touch technique, after lubrication with sterile lignocaine gel the sterile catheter was introduced using forceps. Sterile water was used to inflate the balloon.

*Clean/non-sterile catheterisation* involved washing the hands once using soap and water only. No gowns were used and non-sterile gloves applied. Patients' external genitalia were cleaned only if macroscopically unclean and then only with tap water. No catheter pack was used and the catheter was introduced using KY jelly, taking care not to touch the catheter itself by holding it within its plastic sheath at all times. Tap water was used to inflate the balloon.

For both groups an immediate catheter sample of urine (CSU) and a second one on the 3rd postoperative day were sent for culture. UTI was defined as bacteriuria

$>10^5$  with or without clinical symptoms. Presence of UTI in the first CSU excluded the patient from the study. Statistical differences in the incidence of UTI were investigated using the  $\chi^2$  test,  $P < 0.05$  was considered significant.

## Results

From a total of 162 consecutive general surgical patients, 156 patients were included in the study. Of those excluded, three patients had indwelling catheters, in two the initial CSU showed pre-existing UTI, and one underwent cystoscopy during the operation. There were 84 females and 72 males, with an age range of 22 to 91 years (mean 66.8 years). In all, 74 patients were catheterised with the 'sterile' technique (mean age 67.5 years), and 82 with the 'non-sterile' (mean age 65.3 years); no significant difference. More UTI were seen in females (10/84, ie 11.9%) than males (6/72, ie 8.3%), though this was not statistically significant ( $P > 0.1$ ). No patient below the age of 55 years developed UTI. In total 16 patients developed UTI, seven in the sterile group (9.5%), and nine in the non-sterile group (11%). The difference was not statistically significant ( $P > 0.1$ ).

Table I shows the approximate cost of each technique of catheterisation based on information obtained from supplies departments of two NHS trust hospitals. This refers to a single catheter insertion, all materials being disposable with no re-use, the figures being similar for each hospital.

## Discussion

Urethral catheterisation remains the most common cause of UTI (1). Closed sterile drainage has significantly reduced the incidence of UTI (4,5). However, no study has directly assessed the widely held belief that a sterile technique is essential in reducing the incidence of UTI. In this prospective study we compared two groups of patients undergoing general surgical procedures, randomised to receive a urethral catheter using two different

techniques. Although overall the patients comprised a heterogeneous group, the two randomised groups were similar with respect to age and sex, type of operation and severity of illness.

The results show that there was no significant difference in the incidence of UTI in the two groups, during the short perioperative period, suggesting that technique of catheter insertion does not affect incidence of UTI in that period. However, it is not possible to relate the results to those patients whose catheter was left *in situ* for longer, though it is unlikely that technique of catheter insertion would affect this. In long-term catheterisation, infection occurs by adherence and ascent of bacteria around the catheter from urethral and perineal colonisation. Catheter type or coating may have an influence on this (5,6), as may antibiotics (8-10). Analysis of the results according to sex groups also revealed a similar incidence of UTI with the two methods of catheterisation.

There was a considerable difference in cost between the two techniques, the sterile technique costing well over twice as much as the clean/non-sterile technique. This would represent a substantial cost difference when translated to the large number of such procedures performed in theatres daily, amounting to a significant saving over a period of a year. Such savings are clearly desirable in the current climate of financial restrictions within NHS Trust hospitals.

## References

- 1 Meares EM Jr. Current patterns in nosocomial urinary tract infection. *Urology* 1991; 37 (Suppl): 9-12.
- 2 Nickel JC. Catheter associated urinary tract infection: new perspectives on old problems. *Can J Infect Control* 1991; 6: 38-42.
- 3 Leidberg H. Catheter induced urethral inflammatory reaction and urinary tract infection. *Scand J Urol Nephrol Suppl* 1989; 124: 1-43.
- 4 Wille JC, Blusse von Oud Albas A, Thewessen EA. Nosocomial catheter associated bacteriuria. *J Hosp Infect* 1993; 25: 191-8.
- 5 Roberts JA, Fussell EN, Kaack MB. Bacterial adherence to urethral catheters. *J Urol* 1990; 144: 264-9.
- 6 Farber BF, Wolff AG. Salicylic acid prevents the adherence of bacteria and yeast to silastic catheters. *J Biomed Mater Res* 1993; 27: 599-602.
- 7 Carson CC. Nosocomial urinary tract infection. *Surg Clin North Am* 1988; 68: 1147-55.
- 8 van der Linden MC, van Erp EJ, Ruijs GJ, Holm JP. A prospective randomised study comparing amoxycillin/clavulanate with cefuroxime/metronidazole for prophylaxis in gynaecological surgery. *Eur J Obstet Gynecol Reprod Biol* 1993; 50: 141-5.
- 9 van der Wall E, Verkooyen RP, Mintjes de Groot J et al. Prophylactic ciprofloxacin for catheter associated urinary tract infection. *Lancet* 1992; 339(8799): 946-51.
- 10 Mountokalakis TD, Betrosian AP. Ciprofloxacin to prevent catheter associated urinary tract infection [letter; comment]. *Lancet* 1992; 339(8806): 1422-3.

Received 29 August 1995

Table I. Approximate costs of the two methods of catheterisation (£)

	Sterile	Non-sterile
Gloves	0.91	0.09
Sterile gown	1.78	0
Catheter pack	0.89	0
Lignocaine gel	0.70	0
KY gel	0	0.06
10 ml sterile water	0.14	0
10 ml syringe	0.05	0.05
Catheter bag	0.36	0.36
Foley catheter	2.48	2.48
Scrub solution and skin preparation	0.18	0.02
Total (£)	7.49	3.06